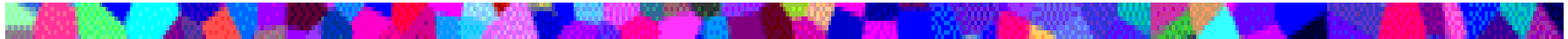


Section 4

Health and Medical Sciences

2004-2005



Need course information?

- **Course Descriptions**
- **Course Sequences**
- **Certifications, Licenses, and Assessments**
- **Career Families**

Section 4: Health and Medical Sciences

Course Descriptions, Sequences, Certifications, Career Families

Section Overview

This section presents course information applicable to the Health and Medical Sciences program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career families. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure. In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. Exception: There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

Career Families

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations. Virginia educational agencies use the terms *career family*, *career area*, and *career role*.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career family to each course. The family is also listed here.

Additional information and samples of CTE course selection using career families are included in Section 11: Instructional Planning with Career Families, Career Areas, and Career Roles.

Middle School Course

Note: The following middle school course is reported in the Health Science career family. Completer sequences and certifications do not apply.

Health and Medical Sciences Exploratory 8370

Grade Level: Middle School (18 weeks, single period)

This course follows a complementary course such as *Careers and You*. Students explore families of health careers and related occupations, participate in self-awareness activities, and receive an overview of the national health industry. Course content may also include the criteria for entering certain biomedical scientific careers and activities dealing with communication, problem solving, and critical thinking.

High School Course Credit in Middle School

Local school divisions may offer certain high school courses to students in middle school and award secondary credit to those students who master the secondary state-approved course competencies. The Health and Medical Sciences secondary course that may be offered in middle school for high school credit is **Introduction to Health and Medical Sciences 8302**.

Introductory Course

Introduction to Health and Medical Sciences 8302

Grade Level: 9 or 10 (36 weeks, single period)

This course introduces the student to all health care careers and develops basic skills common to all health and medical sciences. It is recommended as the first course for the following occupational offerings: Practical Nursing I 8357, Nursing Assistant I 8360, Medical Terminology 8383.

Note: This course may be offered in middle school for high school credit if approved by the local school division.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
Introduction to Health and Medical Sciences 8302 is recommended as the first course for the following occupational offerings: <ul style="list-style-type: none"> • Practical Nursing I 8357* and Practical Nursing II 8358* • Nursing Assistant I 8360 • Medical Terminology 8383 <i>*18-week course</i>	N/A	N/A	Health Science

Biomedical Technology

Biotechnology Foundations 8344

Grade Level: 10, 11, or 12

This course focuses on various techniques that are used to modify living organisms, or parts of organisms, to improve plants and animals, and the development of microorganisms for specific purposes. Student activities range from bioprocessing and genetic engineering to medicine, biomechanical systems, and the environment. Students gain insight and understanding about biotechnology career fields.

Note: This course is reported in the Health Science career family. Sequence and certification information do not apply until the Biomedical Technician course is developed and approved.

Biomedical Technician 8347

Grade Level: 11 or 12

Prerequisite: Biotechnology Foundations recommended

This course is under development. For information, please contact the Health and Medical Science program service at the Virginia Department of Education.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none"> • Biotechnology Foundations 8344 • Biomedical Technician 8347 	N/A	N/A	Health Science

Dental Assistant

Dental Assistant I 8328

Grade Level: 11 (suggested) (36 weeks, double period)

Prerequisites: Keyboarding and Introduction to Health Occupations are strongly recommended.

Students are introduced to the careers in dentistry, including dentist (general and specialists), hygienist, dental assistant, dental laboratory technician, and dental receptionist. Students practice and learn about many of the skills utilized in these professions while attaining all the skills necessary to become a dental assistant.

Study includes infection control and OSHA standards, anatomy and physiology, tooth morphology, oral histology, preventive dentistry, applied psychology, effective communication, office administration and management, use of dental software, operative dentistry techniques, and dental materials/laboratory skills.

Dental Assistant II 8329

Grade Level: 12 (suggested) (36 weeks, double period)

Prerequisite: Dental Assistant I

Units of study include medical emergencies, coronal polishing, oral pathology, dental roentgenology, nutrition, schedule IV drugs and pharmacology, and advanced laboratory techniques. While attending classes for part of the week, students also have an opportunity to participate in internships in local private dental offices and public health dental facilities, where they participate in all phases of dental care delivery. At the completion of the program, students are State Dental Board certified in Radiation Hygiene and Safety and in Schedule IV Drugs and are qualified to work as dental assistant, dental receptionist, patient educator, appointment controller, and dental office manager. After two years in the field, graduates of the program are eligible to take the national examination to become a certified Dental Assistant. Many graduates choose to continue their dental education at community colleges and universities.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none">Dental Assistant I 8328Dental Assistant II 8329	N/A	Available upon completion of Dental Assistant II: <ul style="list-style-type: none">Certified Dental Assistant: Infection Control Examination (Dental Assisting National Board)Certified Dental Assistant: Radiation Health & Safety Examination (Dental Assisting National Board)Dental Assisting Assessment (NOCTI)NRDA Certification (National Allied Health Registry/National Association for Health Professionals)Radiology Safety Examination (Virginia Board of Dentistry)	Health Science

Emergency Medical Technology

Emergency Medical Technician-B I 8333

Grade Level: 11 (36 weeks, double period)

Students focus on the role and responsibilities of emergency rescue workers, basic medical terminology, and health care skills that include first aid; cardiopulmonary resuscitation; aseptic technique; and related anatomy, physiology, and disease knowledge. Supervised work education is provided in a hospital or with rescue squads and is managed by the HOE teacher.

Emergency Medical Technician-B II 8334

Grade Level: 12 (36 weeks, double period)

Prerequisite: EMT-BI 8333

Students become skilled in identifying and dealing with emergencies such as bleeding, fractures, airway obstruction, and cardiac arrest. Instruction emphasizes proper care and use of common emergency equipment and safe methods for lifting, moving, and transporting injured persons. Supervised on-the-job training and patient-care experiences are part of the instructional program. Program completers may take the EMT state certification examination administered by the Virginia Department of Health.

Emergency Medical Technician-B III 8335

Grade Level: 12

Prerequisite: EMT-BII 8334

This course will allow students to strengthen the skills acquired in the basic course and build on their certification level with additional certifications and mentored experience. Students will serve as liaisons with other public safety services (fire control, law enforcement, emergency management). Units of instruction include the following:

- Review of EMT-Basic skills (medical, trauma, environmental
- Pharmacology and drug dosage calculations
- Terrorist awareness and weapons of mass destruction
- Basic trauma life support certification
- Instructional theory—development of lesson plans
- Use of A/V public speaking equipment
- Mentorship

Mentorship/field rotations: This course requires a clinical mentorship for development of proficiency in patient skills. An assigned mentor will evaluate field performance and document basic skill competency.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family
<ul style="list-style-type: none">• Emergency Medical Technician-B I 8333• Emergency Medical Technician-B II 8334	<ul style="list-style-type: none">• Emergency Medical Technician-B I 8333• Emergency Medical Technician-B II 8334• Emergency Medical Technician-B III 8335	Available upon completion of EMT-B II: <ul style="list-style-type: none">• Emergency Medical Technician (Virginia Department of Health)	Health Science

Health Careers Cluster

Health Assistant I 8331

Grade Level: 11 (36 weeks, double period)

Students explore careers in the allied health field by developing basic skills common to several assisting careers. They study body structure and function, principles of health, microbes and disease, and an overview of the national health and patient care system. Supervised work education or on-the-job training may begin as part of the course in hospitals, nursing homes, or public health agencies and is managed by the HOE teacher.

Health Assistant II 8332

Grade Level: 12 (36 weeks, triple period)

Prerequisite: Health Assistant I

Students choose advanced preparation in one of the four tracks—dental, allied health, medical, or nursing—for further classroom instruction and clinical practice. Course content is based on validated competencies for a specific worker such as dental aide, medical assistant, physical therapy aide, or respiratory therapy assistant. Students achieve advanced skills in assisting with therapeutic and emergency measures, patient rehabilitation, care of the elderly; preparing the patient for examination; and performing simple laboratory procedures and health tests. Students prepare to assist physicians, dentists, nurses, and/or therapists in hospitals, nursing homes, clinics, and public health facilities in such jobs as orderly, sterile supply aide, and physical therapy aide. Successful completion may prepare students to take the exam for Certified Nurse Aide and employment in areas such as certified nursing assistant, dental aide, and respiratory therapy assistant.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none">• Health Assistant I 8331• Health Assistant II 8332	N/A	Available upon completion of Health Assistant II: Nurse Aide (Virginia Board of Nursing)	Health Science

Medical Assistant

Medical Assistant I 8345

Grade Level: 11 (suggested) (36 weeks, double-period)

Prerequisites: None—Introduction to Health and Medical Sciences is strongly recommended.

Students develop basic skills and techniques to assist the physician in the following areas: receptionist duties, patient examinations, cardio-pulmonary resuscitation, and simple laboratory tests. On-the-job clinical instruction may occur in physicians' offices or clinics and is coordinated by the Health and Medical Sciences teacher.

Medical Assistant II 8346

Grade Level: 12 (suggested) (36 weeks, triple period)

Prerequisites: Medical Assistant I

Students further develop medical-assisting skills and techniques learned in Medical Assistant I. They also learn medical economics; assembly and maintenance of patient records; care of equipment; special diagnostic testing such as EKG, visual, and audio testing machines; and assistance with office therapy. Advanced on-the-job clinical experience in physicians' offices or clinics is a part of the course. Successful completion of the program leads to employment in physicians' offices or clinics. Keyboarding is recommended.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none">Medical Assistant I 8345Medical Assistant II 83	N/A	Available upon completion of Medical Assistant II: <ul style="list-style-type: none">Medical Assisting Assessment (NOCTI)NRDA Certification (National Allied Health Registry/National Association for Health Professionals)	Health Science

Medical Terminology

Medical Terminology 8383

Grade Levels: 10-12 (18 weeks)

Prerequisite: None—Introduction to Health and Medical Sciences is strongly recommended.

Medical Terminology is designed to help students learn health care language and is presented in logical order, beginning with each body system's anatomy and physiology and progressing through pathology, diagnostic procedures, therapeutic interventions, and finally pharmacology. Concepts, terms, and abbreviations for a topic are also presented to the students.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none">Introduction to Health and Medical Sciences 8302Medical Terminology 8383	N/A	N/A	Health Science

Nursing Assistant

Nursing Assistant I 8360

Grade Level: 11 or 12 (36 weeks)

Prerequisites: None—Introduction to Health and Medical Sciences is strongly recommended.

Nursing Assistant I, offered as a single-, double-, or triple-period occupational preparation course at the 11th-grade level, emphasizes the study of nursing occupations as related to the health care system. Students study normal growth and development, simple body structure and function, and medical terminology and are introduced to microbes and disease. They receive elementary skill training in patient-nursing assistant relationships; taking and recording of vital signs; cardiopulmonary resuscitation; and bathing, feeding, dressing, and transporting of patients in hospitals and nursing homes. Limited on-the-job instruction in nursing homes and hospitals is part of the course. This course can be used as an introduction to practical nursing or to prepare the student for Nursing Assistant II so that all competencies for a certified nursing assistant are met.

Nursing Assistant II 8362

Grade Level: 12 (suggested)(36 weeks)

Prerequisites: Nursing Assistant I

Nursing Assistant II is a double- or triple-period occupational preparation course, emphasizing advanced skill training in areas such as catheter care, range of motion, bowel and bladder training, care of the dying, selected procedures for maternal and infant care, and admission and discharge procedures. Students learn diseases and body systems as related to advanced clinical care of the acute medical-surgical patient, the chronically ill, and the elderly. On-the-job instruction in a licensed nursing home is part of the course. Upon completion of the nursing assistant program, the student is eligible to take the nursing assistant certification exam that leads to employment as a certified nursing assistant in hospitals and nursing homes.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none">Nursing Assistant I 8360Nursing Assistant II 8362	N/A	Available upon completion of Nursing Assistant II: <ul style="list-style-type: none">Nurse Aide (Virginia Board of Nursing)	Health Science

Pharmacy Technician

Pharmacy Technician 8305

Grade Levels: 11 or 12

The certificate program is designed to provide students the basic skills and knowledge to begin work as a Pharmacy Technician. The coursework will fulfill the requirements of the Board of Pharmacy and prepare students to take either the state examination or the national examination administered by the Pharmacy Technician Certification Board. Trained, experienced pharmacy technicians who can demonstrate the right skills and knowledge should be able to pursue many exciting and respected career options or postsecondary study in the field of pharmacy.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
Pharmacy Technician 8305 is a triple-period course that stands alone.	N/A	Available upon completion of Pharmacy Technician: <ul style="list-style-type: none">Virginia Pharmacy Technician Examination (Virginia Board of Pharmacy)	Health Science

Physical/Occupational Therapy

Physical/Occupational Therapy 8385

Grade Level: 11 or 12 (36 weeks, 1 or 2 class periods for 1 or 2 credits)

Prerequisites: Algebra, Biology

The course is designed to provide an introduction to the professions of physical and occupational therapy. Students explore the principles and practices of therapists in the health care industry and participate in a clinical internship under the direct supervision of a licensed physical and/or occupational therapist. Clinical skills in the areas of physical therapy and occupational therapy enable students to gain experience in rehabilitative care, which is practiced throughout the continuum of care and across the life span of individuals. After successful completion of this course, students are prepared for employment as rehabilitation technicians or may seek higher education for specific degrees in a variety of fields such as physical therapy, occupational therapy, speech therapy, sports medicine, athletic training, chiropractic medicine, biology, or exercise physiology.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
Physical/Occupational Therapy 8365 (double-period class)	N/A	N/A	Health Science

Practical Nursing

Practical Nursing I 8357

Grade Level: 11 (suggested)(18 weeks)

Prerequisites: None—Introduction to Health and Medical Sciences is strongly recommended.

Students learn nursing care of patients of all ages, in various stages of sickness or wellness, and with a variety of disease conditions. They focus on human anatomy, body function, communication, community health, fundamental nursing skills, nutrition, drug therapy, and elementary medical-surgical nursing.

Practical Nursing II 8358

Grade Level: 12 (18 weeks)

Prerequisites: Practical Nursing I

Instruction emphasizes introduction to pharmacology, normal life span (human growth and development), normal nutrition, nursing fundamentals, and nursing trends. Advanced emergency procedures and application of nursing procedures are demonstrated in a laboratory setting.

Practical Nursing III 8359

Grade Level: Adult, 13 (36 weeks, full-time)

Prerequisite: Practical Nursing II

Classroom instruction and clinical training are given in approved hospitals, licensed nursing homes, or home-care settings under the direction of a nurse educator. Instruction emphasizes administration of medicines, advanced and complex patient care, and practice with patients of all ages. Students learn advanced anatomy, physiology, and human behavior as related to health and disease, including mental illness. Upon successful completion of the total program, students qualify to take the practical nurse licensing examination.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none"> • Practical Nursing I 8357* • Practical Nursing II 8358* • Practical Nursing III 8359 <i>*18-week course</i>	N/A	Upon completion of Practical Nursing II: <ul style="list-style-type: none"> • Nurse Aide (Virginia Board of Nursing) 	Health Science

Surgical Technology

Surgical Technologist I 8351

Grade Level: 12 (36 weeks, triple period)

Prerequisites: None—Introduction to Health and Medical Sciences or Nursing Assistant I is recommended.

Students acquire knowledge and assisting-level skills to function in association with licensed nurses and surgeons/physicians, providing the best possible care of the surgical patient. Instruction emphasizes human anatomy, medical terminology, cleanliness, asepsis, safety, and efficiency in the operating room.

Surgical Technologist II 8352

Grade Level: Adult, 13 (suggested) (4 months, full-time)

Prerequisites: Surgical Technologist I

Classroom instruction and clinical training are given in selected approved hospitals under the direction of a nurse educator. Students learn operating room procedures and aseptic surgical techniques, including preparation and handling of materials and surgical instruments at the operating table. Upon successful completion of the program, students qualify to take the national certification exam.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none"> • Surgical Technologist I 8351 • Surgical Technologist II (Adult) 8352 	N/A	N/A	Health Science

Veterinary Assistant

Veterinary Assistant Level I 8310

Grade Levels: 10-12 (36 weeks, double or triple period)

Prerequisites: None—Introduction to Health and Medical Sciences is strongly recommended.

Students learn animal science and the care of animals, including animal structure and function, principles of health, and microbes and disease. They develop basic skills and techniques of assisting the veterinarian in the following areas: receptionist duties; animal examinations; examining room and laboratory work; the handling, caring, and feeding of animals; first aid and surgery; and maintenance of equipment and facilities. On-the-job clinical instruction may occur in veterinary offices or animal clinics and is coordinated by the Health and Medical Sciences teacher.

Veterinary Assistant Level II 8311**Grade Levels:** 11-12 (36 weeks, double or triple period)**Prerequisites:** Veterinary Assistant Level I

The student may incorporate a cooperative work experience that combines classroom instruction with two or three hours of school-released time for on-the-job training in a health care facility such as a veterinarian's office or clinic.

Veterinary Assistant Level III 8312**Grade Level:** 12 (36 weeks, double or triple period)**Prerequisites:** Veterinary Assistant Level II

The student will incorporate advanced classroom instruction with two or three hours of release time for on-the-job experience.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family/Area
<ul style="list-style-type: none"> Veterinary Assistant Level I 8310 Veterinary Assistant Level II 8311 	<ul style="list-style-type: none"> Veterinary Assistant Level I HMS8310 Veterinary Assistant Level II HMS8311 Veterinary Assistant Level III HMS8312 	N/A	Agriculture, Food, and Natural Resources

Occupational Mix (with Family and Consumer Sciences)**Home Health Aide 8364****Grade Levels:** 11, 12**Prerequisites:** None—Introduction to Health and Medical Sciences is strongly recommended.

Home Health Aide is designed as an “occupational mix” program that provides entry-level skills within the health-related field. It provides students with the knowledge, understanding, and basic skill training necessary for entering advanced Health and Medical Sciences programs or locating entry-level employment as a certified nurse's aide/home health aide in a hospital, nursing home, home for adults, private home, or other health care setting. To ensure maximum skills and employment opportunities, the curriculum is designed to be taught by both Health and Medical Sciences and the Family and Consumer Sciences teachers. Access to a clinical training facility is essential. Home Health Aide may be offered as a three-hour block senior intensified program or may, as a local option, be scheduled as a two-year, two-hour block at grades 11 and 12.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Family
<ul style="list-style-type: none"> Home Health Aide 8364 Family and Human Services I 8264 	<ul style="list-style-type: none"> Home Health Aide 8364 Introduction to Family and Human Services 8237/8238 Family and Human Services I 8264 <p>or</p> <ul style="list-style-type: none"> Home Health Aide 8364 Family and Human Services I 8264 Family and Human Services II 8265 	N/A	Health Science

Special Programs

Health and Medical Sciences Dual Enrollment—Postsecondary 8266

For information, please contact the Health and Medical Sciences program service, Virginia Department of Education.

